

淡江大學八十八學年度進修學士班轉學生招生考試試題

系別：理工組三年級

科目：工程數學

本試題共 一 頁

一. Find the general solution of $y'' + 4y = x + 2e^{-2x}$. (20%)

二. Find the eigenvalues and eigenvectors of matrix A .

$$A = \begin{bmatrix} 1 & -1 & 0 \\ 0 & 1 & 1 \\ 0 & 0 & -1 \end{bmatrix} \quad (20\%)$$

三. Find the Fourier coefficients of $f(x)$ on $[-3, 3]$,

$$f(x) = \begin{cases} 0 & , -3 \leq x \leq 0 \\ x & , 0 \leq x \leq 3 \end{cases} \quad (20\%)$$

四. Evaluate $\oint_P \left[e^{\frac{1}{z}} + \frac{\sin z}{z^2} \right] dz = ?$ (20%)

where P is a closed path enclosing the origin.

五. Let X be a uniform distribution random variable in $[-1, 1]$ and $Y = 3X + 1$, Find the mean and variance of random variable Y . (20%)